

BREASTFEEDING HISTORY AND FERTILITY DRUGS USE OF BREAST CANCER INCIDENCE OF PATIENTS AT THE HOSPITAL: A CASE-CONTROL STUDY

Dian Ratnasari^{a,*}, Noor Hidayah^b, Fitriana Kartikasari^b

^aRST Tk. II Dr. Soedjono Magelang

^bFaculty of Health Sciences, Muhammadiyah University of Kudus

Jl. Ganesha Raya No. I, Purwosari, Kudus, Indonesia

*Corresponding author: 152023030377@std.umku.ac.id

Article Information	Abstract
DOI : https://doi.org/10.26751/ijp.v10i1.2787	<i>Breast cancer is a malignancy that is frequently diagnosed in women and is the leading cause of cancer-related deaths worldwide. Based on previous studies, a history of not breastfeeding and the use of fertility drugs are suspected risk factors for breast cancer in women. This study aims to determine the risk factors of breastfeeding history and the use of fertility drugs for breast cancer among cancer and non-cancer patients at RS Tk. II Dr. Soedjono Magelang. This research employs a quantitative case-control study design. The primary data used in this study are medical records of women visiting the oncology clinic, inpatient ward, and chemotherapy unit at RS Tk. II Dr. Soedjono Magelang over five weeks from December 20, 2024, to January 25, 2025. A total of 228 women aged 20 to 86 years were identified, including 76 breast cancer patients. The control group in this study consisted of 152 non-breast cancer patients, with a case-to-control ratio of 1:1. A total of 76 control data points were randomly selected from the 152 non-cancer patients. Data collection was conducted using a questionnaire that covered breastfeeding history, history of fertility drug use, and breast cancer diagnosis, categorized as either 'yes' or 'no.' Data analysis was performed using univariate analysis (percentage) and bivariate analysis with the chi-square test. The study results showed a significant association between breastfeeding history and breast cancer, with a p-value of 0.006 and an odds ratio (OR) of 2.49. This means that mothers with a history of not breastfeeding have a 2.49 times higher risk of developing breast cancer compared to those who have a history of breastfeeding.</i>
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I. INTRODUCTION

Breast cancer is a malignant tumor that begins in one or both breasts. Cancer develops when cells start growing uncontrollably. Breast cancer occurs almost entirely in women, although men can also develop the disease. It is important to understand that most breast lumps are benign and not malignant (American Cancer Society, 2021). This disease is the most frequently diagnosed cancer in women worldwide and is

also the leading cause of death due to malignant tumors. The incidence of breast cancer continues to rise across all regions globally despite advances in detection and treatment. The mortality rate from this disease is also increasing (Smolarz et al., 2022).

Breast cancer ranks as the most common cancer among women. In 2022, there were 2,296,840 new cases of breast cancer among women. According to data from the World Cancer Research Fund International (2022),

Indonesia ranks fourth in global cancer mortality, with 22,598 cases, following India, China, and the United States. In Indonesia, Central Java Province has the highest number of breast cancer cases, with 3,206 cases, followed by East Java and the Special Region of Yogyakarta (Ministry of Health of the Republic of Indonesia, 2021). According to statistical medical records, RS Tk. II Dr. Soedjono has recorded an average of 228 breast cancer patients over the past three years.

Several risk factors are closely associated with the increased incidence of breast cancer. One of the most common factors is a family history of breast cancer, with an odds ratio (OR) of 10.9 and a 95% confidence interval (CI) of 1.2–3.5. This indicates that respondents with a family history of breast cancer have a tenfold higher risk of developing the disease compared to those without such a history. The use of hormonal contraceptives also increases the risk, with an OR of 8.169, meaning that women who use hormonal contraceptives for ≥ 5 years are 8.169 times more likely to develop breast cancer. Other factors include female sex, early menstruation (menarche before age 12), late menopause (after age 55), reproductive history (having no children and not breastfeeding), hormonal factors, obesity, alcohol consumption, chest wall radiation exposure, and environmental factors (Herawati et al., 2021).

Another factor contributing to breast cancer incidence is the history of breastfeeding. Research by Riswan and Munawarah (2018) found a significant relationship between these two variables, with a p-value of 0.000 ($p \leq 0.05$). Breastfeeding is considered a protective factor against breast cancer. Women who breastfeed benefit from self-protection in minimizing their risk of developing breast cancer. The longer a woman breastfeeds, the more significant the protective effect. Breastfeeding for 12–23 months reduces the risk of breast cancer by 66.3% compared to women who breastfeed for 0–11 months or do not breastfeed at all. If the duration of breastfeeding increases, the risk reduction

also improves, reaching 87.4% for those who breastfeed for 24–35 months and 94% for those who breastfeed for 36–47 months (Riswan & Munawarah, 2018).

Other studies have also examined the relationship between breastfeeding history and breast cancer incidence. Research by Abraham et al. (2023) demonstrated that a longer duration of breastfeeding was consistently associated with a reduced risk of breast cancer, with a significant p-value of 0.02. Breastfeeding is considered a modifiable risk factor for breast cancer, with an inverse relationship observed in premenopausal women (Abraham et al., 2023). Similarly, a study by Sarinaex et al. (2021) using chi-square analysis found a p-value of 0.002, indicating that mothers who breastfeed for more than one year have a lower risk of developing breast cancer. Women who breastfeed, especially for more than a year, are less likely to develop breast cancer. During breastfeeding, breast cells become more mature, and menstruation is delayed, reducing the number of menstrual cycles. This, in turn, lowers the body's exposure to estrogen, a primary hormone responsible for breast cancer, thus reducing the risk (Sarinaex et al., 2021).

Other factors, such as the use of fertility drugs, may also trigger breast cancer. Research by X. Liu et al. (2022) found a significant association between fertility drug use and breast cancer risk, with an odds ratio (OR) of 1.18 and a 95% confidence interval (CI) of 0.96–1.45. Their study explains that fertility drugs pose a substantial potential risk for developing breast cancer. Fertility treatments involve the use of hormone-related drugs to stimulate the ovaries, which can increase a woman's likelihood of developing breast cancer (Liu et al., 2022).

A current societal phenomenon is the decreasing frequency of exclusive breastfeeding due to various factors, including work commitments, nipple pain, breast engorgement, mastitis, milk leakage, discomfort, and infants' inability to latch. According to the Central Bureau of Statistics (2024), the percentage of exclusive breastfeeding in Indonesia is 73.97%.

Additionally, the use of fertility drugs among couples struggling with infertility has increased significantly. Many individuals are unaware of the physiological effects that may occur. A preliminary survey was conducted at RS Tk. II Dr. Soedjono, among seven randomly selected breast cancer patients, found that five of them had not exclusively breastfed, and four were actively using fertility drugs.

This study aims to determine the relationship between breastfeeding history and the use of fertility drugs with the incidence of breast cancer among patients at RS Tk. II Dr. Soedjono Magelang. The findings of this research are expected to provide valuable information regarding the factors associated with breast cancer risk among hospital patients.

II. RESEARCH METHOD

This study employs a quantitative research design, collecting and analyzing numerical data to identify patterns, relationships, or differences between variables. The research utilizes a case-control design, an analytical study method that examines the relationship between risk factors and disease in a reversed approach compared to traditional methods. In this study, researchers first identify individuals who have already developed the disease or outcome of interest. Then, they compare individuals with the disease (cases) to a control group without the disease to identify and analyze potential risk factors associated with the disease.

This study will be conducted at RST Tk. II Dr. Soedjono Magelang. The research variables include breastfeeding history, the use of fertility drugs, and the incidence of breast cancer. The study will take place from January to February 2025. The study population consists of 228 breast cancer patients at RST Dr. Soedjono. The sampling technique used in this research is non-probability sampling with an accidental sampling method, meaning that any patient who happens to meet the researcher can be used as a sample if they are deemed suitable

as a data source—in this case, women diagnosed with breast cancer.

The sample size in this study was determined using the formula by Nursalam (2016), resulting in a final sample size of 76 respondents, including a dropout reserve (76 respondents for the case group and 76 respondents for the control group). The inclusion criteria for this study are female patients, patients diagnosed with breast cancer for the case group, patients willing to participate without coercion, and patients who do not have reading or writing impairments. The exclusion criteria are male patients and those with advanced-stage breast cancer who are unable to participate in the study.

The questionnaire used consists of checklist responses related to breastfeeding history, the use of fertility drugs, and breast cancer incidence. The research instrument comprises short questions, each directly addressing a specific variable. The breastfeeding history variable is assessed based on the number of months a mother breastfed; if it was less than six months, it is categorized as "Non-Exclusive," while more than six months is categorized as "Exclusive." The fertility drug use variable is assessed with a simple "Yes" or "No" response, which serves as the measurement result for the variable. No validity testing is required since the responses for all variables already serve as direct measurement outcomes.

The data analysis consists of univariate and bivariate analyses, with the bivariate analysis employing the Chi-Square test. This research has undergone an ethical review process by the Health Research Ethics Commission of Muhammadiyah Kudus University and has received ethical clearance with certificate number 95/Z-7/KEPK/UMKU/XII/2024.

III. RESULT AND DISCUSSION

A. Respondent Characteristics

Based on the research conducted at RS Tk. II Dr. Soedjono Magelang, the characteristics

of age and menarche can be seen in the following table:

Table 1. Age and Parity Characteristics of Patients at RS Tk. II Dr. Soedjono

No.	Variable	Mean	Med	Min	Mode
1.	Age	49,45	50	20	55
2.	Menarche	12,53	13	10	13

No.	Variable	Max	Std.
1.	Age	86	12,77
2.	Menarche	15	1,02

Source: research primary data, 2025

Based on the table above, the age characteristics of respondents show an average age of 51.33 years, a median age of 49.45 years, the most frequently occurring age of 50 years, a minimum age of 20 years, and a maximum age of 86 years. For menarche characteristics, the average age among respondents is 12.53 years, with a median of 13 years, the most frequently occurring menarche age of 13 years, a minimum menarche age of 10 years, and a maximum of 15 years. Women within the risk age category have a 4.297 times higher likelihood of developing breast cancer compared to those outside the risk age group. Typically, women develop breast cancer approximately five years before entering menopause. The increasing incidence of breast cancer in women over 50 years old is attributed to a decline in organ function and a weakened immune system. The risk of breast cancer exposure increases with age due to genetic mutations influenced by aging and hormonal exposure. Estrogen exposure, which plays a role in breast cancer development, is also affected by age (Sulviana & Kurniasari, 2021).

An earlier menarche age can heighten the risk of breast cancer by extending the body's exposure to estrogen and progesterone. These hormones are involved in cell proliferation processes, including breast tissue cells. Women who experience menarche before 12 years old tend to have more prolonged hormonal exposure, which may elevate their risk of developing breast cancer. Thus, the earlier the age of menarche, the higher the

likelihood of cellular changes that could lead to breast cancer (Uswatun & Yuliyani, 2016).

Based on the research conducted at RS Tk. II Dr. Soedjono Magelang, the characteristics of education level and parity can be seen in the following table:

Table 2. Characteristics of Education Level and Parity of Patients at RS Tk. II Dr. Soedjono Magelang

No.	Variable	Category	f	%
1.	Education Level	Primary	27	17,8%
		Junior High	50	32,9%
		High School	65	42,8%
		College	10	6,6%
2.	Parity	Primipara	16	10,5%
		Multipara	135	88,8%
		Grand multipara	1	0,7%

Source: research primary data, 2025

Based on the table above, the educational characteristics are dominated by respondents with a high school education, totaling 65 respondents (42.8%). Meanwhile, the multipara category dominates the parity characteristics, with 135 respondents (88.8%). Education level is related to respondents' knowledge about breast cancer, which ultimately influences their lifestyle behaviors. Information absorption aligns with the level of education—the higher the education level, the more information and knowledge a person acquires, which affects individual awareness of a healthy lifestyle (Faija Sihombing, 2021).

Studies show that the number of children a woman has is associated with a reduced risk of breast cancer because pregnancy and breastfeeding lower exposure to hormones that can stimulate cancer cell growth. Repeated pregnancies increase hormone exposure, modifying breast structure and providing protection against breast cancer development. However, other factors—such as age at first childbirth, duration of breastfeeding, and family history—have a more significant impact on breast cancer risk than the number of children. Some studies also do not find consistent evidence that the number of children directly influences breast cancer occurrence, as genetic and environmental factors play significant roles (Nurhayati et al., 2019).

B. Characteristics of Breastfeeding History, Fertility Drug Use, and Breast Cancer Incidence

Based on the study conducted at RS Tk. II Dr. Soedjono Magelang, the characteristics

of breastfeeding history, fertility drug use, and breast cancer incidence can be seen in the following table:

Table 3. Characteristics of Breastfeeding History, Fertility Drug Use, and Breast Cancer Incidence in Patients at RS Tk. II Dr. Soedjono Magelang

No.	Variable	Category	f	%
1.	Breastfeeding History	Non-exclusive	71	46,7 %
		Exclusive	81	53,3 %
2.	Fertility Drug Use	Yes	14	9,2%
		No	138	90,8%
3.	Breast Cancer Incidence	Breast Cancer (Case)	76	50,0%
		No Breast Cancer (Control)	76	50,0%

Source: research primary data, 2025

Based on the table above, the characteristic of breastfeeding history is predominantly in the exclusive category, with 81 respondents (53.3%). Meanwhile, the characteristic of fertility drug use is mainly in the "no" category, with 138 respondents (90.8%). Furthermore, in terms of breast cancer incidence, both the breast cancer (case) and non-breast cancer (control) groups have the same number of respondents, totaling 76 (50.0%).

The duration of breastfeeding serves as an indicator related to breast cancer incidence in women of reproductive age. The longer the breastfeeding period, the greater the likelihood of avoiding breast cancer. This

occurs because, during breastfeeding, estrogen levels decrease, and factors that promote cancer growth are reduced. Therefore, a more extended breastfeeding period provides better outcomes in lowering the risk of breast cancer (Salsabila & Mediana, 2024).

C. The Relationship Between Breastfeeding History and Breast Cancer Incidence

Based on the study conducted at RS Tk. II dr. Soedjono Magelang, the relationship between breastfeeding history and breast cancer incidence can be seen in the following table:

Table 4. the Relationship Between Breastfeeding History and Breast Cancer Incidence in Patients at RS Tk. II dr. Soedjono Magelang

Breastfeeding History	Breast Cancer Incidence						OR	p-value
	Breast Cancer		No Breast Cancer		Total			
	N	%	N	%	N	%		
non-exclusive breastfeeding	44	62,0	27	38,0	71	100	2,49	0,006
exclusive breastfeeding	32	39,5	49	60,5	81	100		
Total	76	50,0	76	50,0	152	100		

Based on the table above, it can be seen that among patients with a non-exclusive breastfeeding history, a total of 71 patients, more than half—44 patients (62.0%)—experienced breast cancer. Meanwhile, among patients with an exclusive breastfeeding history, a total of 81 patients, more than half—49 patients (60.5%)—did not experience breast cancer.

Statistical analysis using the Chi-Square test showed a significant relationship

between breastfeeding history and breast cancer incidence among patients at RS Tk. II dr. Soedjono Magelang, with a p-value of 0.006. This indicates a meaningful association between breastfeeding history and breast cancer incidence. The odds ratio (OR) value of 2.49 suggests that individuals who did not exclusively breastfeed are 2.49 times more likely to develop breast cancer than those who did. The conclusion drawn is that the less a patient exclusively breastfeeds,

the higher the potential for worsening breast cancer, whereas exclusive breastfeeding reduces the likelihood of exacerbating the disease.

The analysis of the relationship between breastfeeding history and breast cancer incidence confirms a significant relationship between the two variables, as indicated by the p-value of 0.006. Although the correlation is weak, it still supports the conclusion that non-exclusive breastfeeding increases the risk of breast cancer while exclusive breastfeeding reduces this risk. This finding is supported by research from Riswan and Munawarah (2018), which states that breastfeeding is considered a protective factor against breast cancer. Women who breastfeed provide themselves with protection against breast cancer. Longer breastfeeding durations enhance this protective effect. Breastfeeding for 12 to 23 months has been shown to reduce breast cancer risk by 66.3% compared to women who breastfeed for less than 12 months or do not breastfeed at all. As breastfeeding duration increases, the risk reduction becomes more significant, reaching 87.4% for women who breastfeed for 24 to 35 months. Women who breastfeed for 36 to 47 months can achieve a remarkably high risk reduction of up to 94% (Riswan & Munawarah, 2018).

Another perspective on the relationship between breastfeeding and breast cancer incidence comes from Abraham et al. (2023),

who argue that breastfeeding is a modifiable risk factor for breast cancer and has an inverse relationship with breast cancer incidence in premenopausal women. The longer and more frequently a woman breastfeeds, the greater the protective effect against breast cancer. This protection is influenced by hormonal, immunological, and physiological changes during breastfeeding. Breast tissue undergoes cell differentiation during breastfeeding, and the number of ovulation cycles decreases, reducing estrogen exposure. This long-term reduction in estrogen exposure lowers the risk of breast cancer (Abraham et al., 2023).

Breastfeeding for more than one year has been shown to reduce breast cancer risk in women. Women who breastfeed, especially those who do so for more than one year, have a lower chance of developing breast cancer. During breastfeeding, breast cells mature, and menstrual cycles become less frequent or delayed, reducing estrogen exposure. Since estrogen is a significant factor in breast cancer development, longer breastfeeding durations provide more excellent protection against the disease (Sarinaex et al., 2021).

D. The Relationship Between Fertility Drug Use and Breast Cancer Incidence

Based on the research conducted at RS Tk. II dr. Soedjono Magelang, the relationship between fertility drug use and breast cancer incidence can be seen in the following table:

Table 5. The Relationship Between Fertility Drug Use and Breast Cancer Incidence in Patients at RS Tk. II dr. Soedjono Magelang

Breastfeeding History	Breast Cancer Incidence						OR	p-value
	Breast (Case)	Cancer	No Breast Cancer (Control)		Total			
	N	%	N	%	N	%		
Yes	6	42,9	8	57,1	14	100	0,73	0,575
No	70	50,7	68	49,3	138	100		
Total	76	50.0	76	50.0	152	100		

Source: research primary data, 2025

Based on the table above, it can be seen that among the 14 patients who used fertility drugs, 6 respondents (42.9%) were diagnosed with breast cancer, while 8 respondents

(57.1%) did not develop breast cancer. Meanwhile, among the 138 patients who did not use fertility drugs, 70 respondents (50%) were diagnosed with breast cancer, and 68

respondents (50%) did not develop breast cancer.

Statistical analysis using the Chi-Square test revealed that there was no significant relationship between fertility drug use and the incidence of breast cancer among patients at RS Tk. II dr. Soedjono Magelang, with a p-value of 0.575. This indicates that there is no meaningful association between the use of fertility drugs and breast cancer incidence. The Odds Ratio (OR) value of 0.73 suggests that individuals who use and do not use fertility drugs have only a slight difference in breast cancer risk. The conclusion indicates that patients who use or do not use fertility drugs have an equal likelihood of developing or not developing breast cancer.

Analysis of the relationship between fertility drug use and breast cancer incidence showed no significant association between the two variables, as indicated by the p-value of 0.575. This finding suggests that both groups—those who use fertility drugs and those who do not—have a similar likelihood of experiencing or avoiding breast cancer. However, this study contrasts with the findings of Liu et al. (2022), who suggested that fertility drug use is associated with an increased risk of breast cancer. Their research indicates that fertility drug use may increase the likelihood of developing breast cancer. Women with a family history of breast cancer often experience fertility issues and are more likely to undergo fertility treatments. The medications used in fertility treatments, which contain hormones to stimulate the ovaries, may elevate the risk of breast cancer, particularly in women with a hereditary predisposition to the disease (Liu et al., 2022).

The use of fertility drugs can increase estrogen and progesterone levels, potentially raising the risk of breast cancer, especially with long-term use. However, high hormone exposure occurs only briefly, meaning multiple treatment cycles may be required for prolonged exposure. Despite the biological plausibility, research findings on the relationship between fertility drugs and breast cancer remain contradictory. Some studies suggest an increased risk, while

others indicate no significant effect (Pfeifer et al., 2016).

This study found no significant association between fertility drug use and breast cancer incidence, aligning with the findings of Ningrum and Rahayu (2021). However, some studies suggest a potential link between the two, though the results remain inconclusive. Factors such as the lack of long-term studies and confounding variables often complicate drawing definitive conclusions. The role of endogenous and exogenous hormones in increasing breast cancer risk must also be considered as a potential contributing factor. Therefore, while current evidence is inconsistent, there is still a possibility that fertility drug use could be related to an increased risk of breast cancer (Ningrum & Rahayu, 2021).

A limitation of this study is the validity and reliability of the measurement tools used. This study did not require instruments that needed validity and reliability testing. The questions were structured with direct response options that also served as research variables, such as breastfeeding history being answered as "Exclusive" or "Non-exclusive" and fertility drug use being answered as "Yes" or "No." Therefore, no validity or reliability measurements were necessary.

IV. CONCLUSION

There is a relationship between breastfeeding history and the incidence of breast cancer. However, there is no relationship between the use of fertility drugs and the incidence of breast cancer. The recommendation of this study is to conduct further research while considering other factors that may influence the occurrence of breast cancer, such as family history and lifestyle, to gain a deeper understanding of breast cancer risk factors.

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